

CLAIMS

1. A DNA which comprises a nucleotide sequence represented by a SEQ ID NO selected from the group consisting of SEQ ID NO: 1 to SEQ ID NO: 19.

2. A method for amplifying a DNA coding for a G protein coupled receptor protein by polymerase chain reaction techniques, which comprises:

(i) carrying out a polymerase chain reaction in the presence of a mixture of

- ① a DNA coding for a G protein coupled receptor protein, said DNA being capable of acting as a template,
- ② at least one DNA primer selected from the group consisting of DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 1, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 3, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 5, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 6, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 7, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 10, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 14, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 16 and DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 18, and
- ③ at least one DNA primer selected from the group consisting of DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 2, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 4, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 8, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 9, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 11, DNA primers comprising a nucleotide

sequence represented by SEQ ID NO: 15, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 17 and DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 19; or

5 (ii) carrying out a polymerase chain reaction in the presence of a mixture of

- ① a DNA coding for G protein coupled receptor protein, said DNA being capable of acting as a template,
- 10 ② at least one DNA primer selected from the group consisting of DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 1 and DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 12, and
- 15 ③ at least one DNA primer selected from the group consisting of DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 13.

3. A method for screening a DNA library for a DNA coding for a G protein coupled receptor protein, which comprises:

20 (i) carrying out a polymerase chain reaction in the presence of a mixture of

- ① said DNA library,
- 25 ② at least one DNA primer selected from the group consisting of DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 1, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 3, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 5, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 6, DNA
- 30 primers comprising a nucleotide sequence represented by SEQ ID NO: 7, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 10, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 14, DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 16 and DNA primers comprising a nucleotide sequence represented by SEQ ID NO: 18, and
- 35 ③ at least one DNA primer selected from the group

consisting of DNA primers comprising a nucleotide
sequence represented by SEQ ID NO: 2, DNA primers
comprising a nucleotide sequence represented by SEQ ID
NO: 4, DNA primers comprising a nucleotide sequence
represented by SEQ ID NO: 8, DNA primers comprising a
nucleotide sequence represented by SEQ ID NO: 9, DNA
primers comprising a nucleotide sequence represented by
SEQ ID NO: 11, DNA primers comprising a nucleotide
sequence represented by SEQ ID NO: 15, DNA primers
comprising a nucleotide sequence represented by
SEQ ID NO: 17 and DNA primers comprising a nucleotide
sequence represented by SEQ ID NO: 19,

under conditions to amplify selectively a template DNA coding
for the G protein coupled receptor protein, contained in the
DNA library and selecting said DNA; or

(ii) carrying out a polymerase chain reaction in the presence
of a mixture of

- ① said DNA library
- ② at least one DNA primer selected from the group
consisting of DNA primers comprising a nucleotide
sequence represented by SEQ ID NO: 1 and DNA primers
comprising a nucleotide sequence represented by SEQ ID
NO: 12, and
- ③ at least one DNA primer selected from the group
consisting of DNA primers comprising a nucleotide
sequence represented by SEQ ID NO: 13,

under conditions to amplify selectively a DNA coding for the G
protein coupled receptor protein, contained in the DNA library
and selecting said DNA.

4. A DNA coding for a G protein coupled receptor
protein or a fragment thereof, which is obtained by the method
according to claim 2 to 3.

5. A G protein coupled receptor protein encoded by
the DNA according to claim 4, a peptide segment or fragment
thereof or a salt thereof.

6. A G protein coupled receptor protein comprising
an amino acid sequence selected from the group consisting of

an amino acid sequence represented by SEQ ID NO: 24, an amino acid sequence represented by SEQ ID NO: 25, an amino acid sequence represented by SEQ ID NO: 26, an amino acid sequence represented by SEQ ID NO: 27, an amino acid sequence represented by SEQ ID NO: 28, an amino acid sequence represented by SEQ ID NO: 34, an amino acid sequence represented by SEQ ID NO: 35, an amino acid sequence represented by SEQ ID NO: 38, an amino acid sequence represented by SEQ ID NO: 39, an amino acid sequence represented by SEQ ID NO: 56, and substantial equivalents to the amino acid sequence represented by SEQ ID NO: 24, SEQ ID NO: 25, SEQ ID NO: 26, SEQ ID NO: 27, SEQ ID NO: 28, SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 38, SEQ ID NO: 39, or SEQ ID NO: 56; a peptide segment (or fragment) thereof, a modified peptide derivative thereof or a salt thereof.

7. The G protein coupled receptor protein according to claim 6, comprising an amino acid sequence selected from the group consisting of an amino acid sequence represented by SEQ ID NO: 38, an amino acid sequence represented by SEQ ID NO: 39, an amino acid sequence represented by SEQ ID NO: 56 and substantial equivalents to the amino acid sequence represented by SEQ ID NO: 38, SEQ ID NO: 39, or SEQ ID NO: 56.

8. The G protein coupled receptor protein according to claims 6 or 7, wherein said receptor is a purinoceptor.

9. The G protein coupled receptor protein according to any of claims 6 to 8, wherein an agonist to said receptor is useful as an immunomodulator or an antitumor agent, in addition it is useful in therapeutically or prophylactically treating hypertension, diabetes or cystic fibrosis, and an antagonist to said receptor is useful as a hypotensive agent, an analgesic, or an agent for therapeutically or prophylactically treating incontinence of urine.

10. A DNA which comprises a nucleotide sequence coding for a G protein coupled receptor protein of claim 6.

11. The DNA according to claim 10 comprising a nucleotide sequence coding for the G protein coupled receptor

protein according to claim 7.

12. The DNA according to claim 11 comprising a nucleotide sequence represented by SEQ ID NO: 40, SEQ ID NO: 41, or SEQ ID NO: 57.

5 13. A transformant containing a vector comprising the DNA according to claim 4 or 10; or an expression system comprising an open reading frame (ORF) of DNA derived from a G protein coupled receptor protein DNA according to claim 4 or 10, wherein the ORF is operably linked
10 to a control sequence compatible with a desired host cell.

14. A method for determining a ligand to the G protein coupled receptor protein according to any of claims 5 to 8, which comprises contacting

(i) at least one component selected from the group
15 consisting of G protein coupled receptor proteins or salts thereof according to any of claims 5 to 8, peptide segments or salts thereof, and mixtures thereof,
with

(ii) at least one compound to be tested
20 and determining whether said compound to be tested bound to the component of (i).

15. A screening method for a compound capable of inhibiting the binding of a G protein coupled receptor protein according to any of claims 5 to 8 with a ligand, which
25 comprises carrying out a comparison between:

(i) at least one case where said ligand is contacted with at least one component selected from the group consisting of G protein coupled receptor proteins or salts thereof according to any of claims 5 to 8,
30 peptide segments or salts thereof, and mixtures thereof,
and

(ii) at least one case where said ligand together with a compound to be tested is contacted with at least one component selected from the group consisting of G protein coupled receptor proteins or salts thereof
35 according to any of claims 5 to 8, peptide segments or salts thereof, and mixtures thereof.

16. A compound which is determined through the method according to claim 15 or a salt thereof.

17. The compound according to claim 16, which is an agonist or antagonist to a G protein coupled receptor protein according to any of claims 5 to 8.

18. A ligand to a G protein coupled receptor protein according to any of claims 5 to 8, which is determined through the method according to claim 14.

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